

CENTRAL ASIAN EXPLORATION.<sup>1</sup>

DR. SVEN HEDIN'S latest book possesses an interest for the great world of travellers which is apart from its intrinsic merit as a traveller's record. The blank spaces of the world's map are becoming so narrow; there is so little left for the exploring enthusiast to mark with his pioneer footsteps, that books of this nature must necessarily grow scarcer as the world grows older. This may be one of the last of a grand series which has educated the world (in divers tongues) since the days of Herodotus. The finger of the North Pole still beckons to us, as does that of the South; there are still a few sand wastes in the interior of Arabia, and a few thousands of forest leagues in the interior of South America which have not yielded up their secrets to the keen eye of scientific inquiry—but that is about all. It is the unattractive emptiness of the wildest and most desolate wastes which still remains to be explored, so that the tale which has yet to be told of them will be told by none but men of the true race of the world's heroes of research—men of the stamp of Peary and Sven Hedin—who explore because, to them, the first acquisition of knowledge of the unknown is the one thing that makes life worth living.

The story that is now told by Sven Hedin is one of stirring personal adventure leading to discoveries in a very old world rather than in a new one, and instinct with the interest of human history. He tells it well, introducing to us the companions of his travels one by one, making us acquainted with their weaknesses and their strength, familiarising us with his surroundings, his horses, and his dogs (and even those usually uninteresting brutes, his camels), until we can see the whole of this little Central Asian caravan moving across the deserts and through the mountain defiles as if we were one with them, hoping their hopes, fearing their fears, and deploring with them the loss of those brave helpers who fall by the way. No novel could carry the reader along with the course of its plots and its evolutions until the final dénouement more completely. Sven Hedin is a good English scholar himself, and he is to be congratulated on his choice of a translator. Very few books of travel written, as this is, in diary form avoid the Scylla of dullness without wreck on the Charybdis of untruth. A little poetic licence is usually necessary to enliven the narrative. But here any man who has seen anything of those remote Asiatic fields which Sven Hedin describes, recognises at once the atmosphere of absolute truthfulness in which the drama moves. There is not a risk incurred, not a danger (and the whole record is full of them) escaped, which is not the natural sequel of the daring conception of each phase of the three years' journeying—not one which any traveller could reasonably have hoped to avoid had he marked out for himself Sven Hedin's expeditions with Sven Hedin's courage.

His first enterprise, the voyage down the Tarim River, to its ending in the desert, illustrates the marvellous patience and pertinacity of the man. To most people it would have been enough to glide gently down the stream watching the changing lights and shadows and the glorious autumn tinting of the poplar woods, and to have made a record at the end of each day's

run of its general direction and its terminal latitude. This was not good enough for Sven Hedin. Hour after hour he sat at his work in the boat, mapping each turn, each curve, in the twisting, winding stream, noting its depth, the strength of its current and its peculiarities, until sometimes sixteen hours a day of intermittent work was achieved without once leaving his table. If genius is an "infinite capacity for taking pains," then indeed does Sven Hedin possess that desirable attribute. It must be noted, too, that in a desert like that of the Takla Makan, such natural hydrographic features as exist must inevitably change almost from year to year. There is no more permanency about the course of the Tarim River than there is about the "locus" of Lop Nor. All Sven Hedin's magnificent map making may require serious correction within the next few years.

The very centre of interest in Central Asian geography lies in the Lop Nor region. The former existence of a high road across the desert connecting the outlying city of Western China, Sachow (Saitu), with Yarkand and Kashgar by a route skirting the northern spurs and outlying ridges of the Altyn Tagh (Astyn Tagh, according to Sven Hedin) to Cherchen, and



FIG. 1.—Tibetan Soldiers. (From "Central Asia and Tibet.")

thence following the Cherchen River until it again touches the northern foot hills of the Kuen Lun, and thus extends itself to Nia and Khotan, has long been recognised; but we must now accept the theory of a more direct road westward connecting Sachow with the ancient city of Lou Lan, so well described in Sven Hedin's book. Lou Lan was a small and independent State in the early centuries of our era, dovetailed as a buffer between China and the Turkish Hun tribes, who together appear to have rendered its political life as uneasy as more modern buffer States have found such a life to be. That this isolated State existed only by grace of the existence of the Lop Nor Lake is sufficiently proved by its total disappearance when the waters of Lop Nor (the old bed of which lake is placed further north by Sven Hedin than our existing maps show it—about midway between the Altyn Tagh on the south, and the Kurruk Tagh on the north) shifted southward. This was no case of sand burying. The whole water supply of the district gradually withdrew to another position, forming new lakes on the inconceivably flat surface of the desert some fifty miles away; and the extraordinary feature about this move-

<sup>1</sup> "Central Asia and Tibet." By Sven Hedin. Vol. i., pp. xvii+608; vol. ii., pp. xiv+664. (London: Hurst and Blackett, Ltd., 1903.) Price 42s. net.

ment is that the lakes which were so formed appear now, after many centuries, to be in the process of transferring themselves once again to their old place, the place which was assigned to them in early Chinese maps.

It is characteristic of the thoroughness of the work of this great traveller that he actually levelled the land surface between the ancient Lop Nor depression and the Kara Koshun (the present lake bed), and has proved beyond dispute the theory of a migratory, or moving, lake. That Lou Lan was Buddhist is sufficiently attested, not only by the nature of the relics discovered on its site, but by the peculiar construction of those solid brick erections which Sven Hedin calls towers, but of which the photographs quite clearly indicate the nature. They are Buddhist topos or stupas. Thus we have another link in the long chain of Buddhist centres (temples and holy places) stretching from Western China through the deserts, past the group of towns unearthed by Stein, broken for a space by the intervening Himalayas, and then recommencing in the valleys of Gilgit, Darel and Swat, until it ended in the valley of Peshawar.

The last part of Sven Hedin's story is devoted to

records of which even Sven Hedin may be proud. To the world at large he is already known as a great geographer and an intrepid explorer. Hereafter he will be recognised as a most fascinating writer even by those who care little for geography.

T. H. H.

#### WATER SUPPLY AND IRRIGATION IN THE UNITED STATES.

FOR the last fourteen years very great attention has been paid by the Geological Department of the Government of the United States to the water resources of the country, and in acquiring trustworthy information as to the same.

There has recently been issued from the Government Press at Washington fifteen volumes of reports, and water supply and irrigation papers, bearing on the yield of the rivers, the various methods adopted for gauging the flow and obtaining sectional measurements, artesian wells and the flow and yield of underground water, the means adopted for storage, the use of water for the supply of towns for irrigation and for power purposes, and the pollution of rivers from sewage and other causes.<sup>1</sup>

The greater part of these reports is taken up with records of the observations of the staff engaged in measuring the rivers in the different States and obtaining information as to water supply, which, although mainly of use to engineers in the United States, might also be interesting and instructive to those engaged in the water supply of this country.

The report No. 76 by Mr. Pressey on the flow of rivers in the vicinity of New York State is of special interest, as it deals in a comprehensive manner with the methods adopted for obtaining trustworthy information as to the yield of rivers, and gives details as to the methods adopted for obtaining the measurements necessary for the purpose.

The author of this report considers that one of the chief resources of the United States consists in its water. The prominent industrial position of several States is due largely to the abundance of available water, and the rivers with their great water power have been in the past, and

will continue to be in the future, a perpetual source of wealth. Contrary to what might have been expected, Mr. Pressey is of opinion that there never was a period in the history of the United States when the development of water power has made such strides as recently, the increase in the utilisation of water power for the period 1890-1900 being 30 per cent., or 472,361 horse power. In the State of Maine the developed power increased 60 per cent.

The rivers as water suppliers are also of inestimable value in the arid regions of the coastal States, where without an artificial supply of water there cannot be any vegetation, and where large areas have been reclaimed and made into agricultural land of great fertility by storing and distributing the water over their soils. This subject was shortly dealt with in the notice in *NATURE* of April 30, 1903, on the irrigation in the Western States of America, and of the report of the Mexico College of Agriculture in *NATURE* of August 27, 1903.

The Geological Department has for the last fourteen

<sup>1</sup> Copies of these reports may be obtained through Messrs. King and Son, Great Smith Street, Westminster.

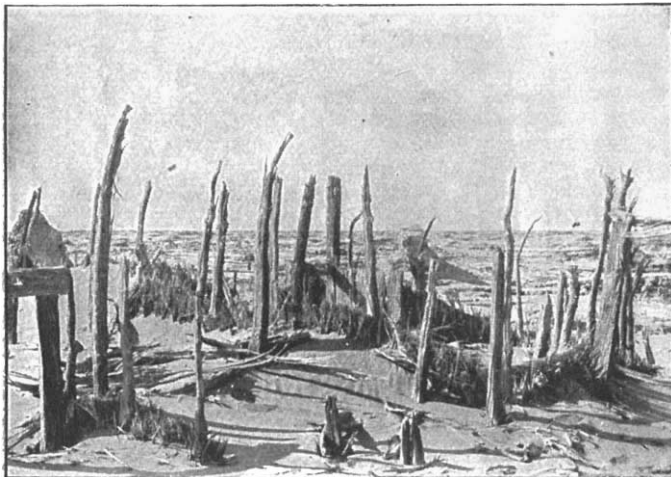


FIG. 2.—Ruined house with its doorway standing *in situ*. (From "Central Asia and Tibet.")

his gallant but unsuccessful attempt to reach Lhasa. Beyond doubt he was betrayed by the Mongol pilgrims whom he encountered early in his journey. The Lhasa authorities were fully informed, and the attempt was foredoomed to failure. None the less was it a most instructive journey. It hardly needed the evidence of the distinguished traveller to prove that Tibetans possess civilised and humane instincts. They do not necessarily ill-use a casual visitor to their country who can make himself intelligible and agreeable, but they will not admit the European within the gates of their holy city—if they can help it. We now have more material with which to construct the maps of that dreary, storm-swept, inhospitable waste which lies between the Altyn Tagh and the oasis of the Sanpo (Brahmaputra). The identification of the ancient bed of the Lop Nor and the site of Lou Lan; the elimination from our maps of the Gobi Mountains and the eastern extension of the Kurruk Range; the detailed survey of the Tarim River and the determination of the levels of the desert surface south of Lop Nor, together with the results of a vast area of geographical research on the north coast of Tibet, are